# COMPSCI 4ML3, Introduction to Machine Learning
# Course Outline, Winter 2019

Hassan Ashtiani, McMaster University

## 1 Lectures

- Hassan Ashtiani, zokaeiam@mcmaster.ca, ITB 246

- Mondays 2:30-3:20pm (CHN 103)

- Wednesdays 2:30-4:20pm (CHN 103)

- Office Hours: Mondays 3:30-4:30

## 2 Tutorials

- S. Morteza. M. Nejad, mirhoses@mcmaster.ca, ITB 207

- Tuesdays 10:30-11:20am (BSB 106)

- Office Hours: Tuesday 11:30-12:30

## 3 Final Grade Breakdown

- 4 Assignments: 30%

- Midterm: 30% (on Wednesday, Feb 27)

- Final exam: 40% (all the material)

## 4 Logistics

- Assignments and slides will be uploaded to Avenue.

- Piazza is used for discussions, announcements. (Send an email to the instructor if you are not enrolled.)

- Not all the material discussed in the class reflect in the slides; it is your responsibility to take additional notes in the class.

- You can submit your assignment solutions through Avenue (preferred); alternatively, you can hand in the hard copy to the TA/instructor. Assignments are supposed to be solved individually.

- You will lose 20% of an assignment's grade if you submit it up to 24 hours late, and 50% if you submit it up to 1 week late. No assignments are accepted after 1 week passed the deadline.

- The exams will be based on the material taught in the class or presented in the assignments. The recommended textbook for the course is "Pattern Recognition and Machine Learning" by Christopher M. Bishop.

## 5 Course Objectives

This is an introductory but math-intensive course on foundations of machine learning. The goal is to familiarize students with typical machine learning tasks, how they can be mathematically modeled, and the standard techniques that are used in solving them.

The major part of the course is concerned with supervised learning, namely classification and regression problems. The course starts with introducing basic linear models (e.g, Logistic Regression, Least Squares, SVMs), and then extends to the non-linear setup (e.g., Neural Networks and Kernel methods). Along the way, some related probabilistic Bayesian methods are discussed. Other topics include non-parametric methods (e.g., K-Nearest Neighbor), model aggregation (e.g., Boosting), and an introduction to unsupervised learning.

There will be an emphasis on introducing a notion of statistical efficiency (as opposed to the computational one). It is expected that the concept of over-fitting (and the possible ways of avoiding

it) becomes clear throughout the course.

# 6 Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:

- Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.

- Improper collaboration in group work.

- Copying or using unauthorized aids in tests and examinations.

# 7 Disabilities

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

# 8 Requests for relief for missed academic work

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

# 9 Academic accomodations for religious, indigenous or spiritual observations (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

# 10 Extreme circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.